MULTIMEDIA UNIVERSITY

STUDENT ID NO

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 2, 2017/2018

DCT5038 – DATA COMMUNICATIONS AND NETWORKING

(DIT & DBIS)

15 MARCH 2018
2.30 PM – 4.30 PM
(2 Hours)

INSTRUCTIONS TO STUDENTS

1. This question paper consists of **THREE (3)** pages.
2. Answer **ALL FIVE (5)** questions.
3. Write all your answers in the **Answer Booklet** provided.

Instruction: *Answer **ALL** the questions in this section and write your answers in the answer booklet provided.*

QUESTION 1 **(20 Marks)**

a) Given that in a mesh network, there are 45 links. Determine the following:
   i. Total number of devices connected. (2 Marks)
   ii. Number of ports required per device. (2 Marks)

b) Draw a hybrid topology with a star backbone and three bus networks. (6 Marks)

c) Give **ONE (1)** advantage and **ONE (1)** disadvantage for each of the following topology:
   i. Star topology. (2 Marks)
   ii. Bus topology. (2 Marks)

d) Refer to the figure below, write the name of Open System Interconnection (OSI) layer with label A until F. (6 Marks)

A
Presentation Layer
B
C
D
E
F

QUESTION 2 **(20 Marks)**

a) Assume the total bandwidth used in FDM multiplexing is 68800 Hz. There is 12 signal source with guard bands of 800 Hz. Calculate :
   i. Number of guard band used. (2 marks)
   ii. Bandwidth use for each signal source in kHz. (3 marks)

b) Assume multiple slot Time-division Multiplexing (with 1 bit synchronizing bits) is use to combine 5 sources, with a bit rate of 100 kbps. Each output slot carries 1 bit from each digital source.
   i. What is the size of a frame in bits? (2 marks)
   ii. What is the frame rate? (2 marks)
   iii. What is the duration of a frame? (2 marks)
   iv. What is the data rate? (2 marks)

c) Twisted pair cabling is a type of wiring in which two conductors of a single circuit are twisted together. Why there is a need to twist the cables in a twisted pair? Justify your answer. (4 marks)

d) Identify **THREE (3)** types of wireless transmission. (3 marks)

Continued...

QUESTION 3 (20 Marks)

a) Describe **TWO (2)** types of error that happen due to change of bit in data communication. Illustrated **ONE (1)** example for each type of error. (8 Marks)

b) Given the dataword 111010 and the divisor 1101, use the CRC method to show the generation of the codeword at the sender side. (6 Marks)

c) A sender send a block of information as follow.

11011111 10111011 01010011 10001110

If an even parity is used, show the complete of block of information that will be received by the receiver. (6 Marks)

QUESTION 4 (20 Marks)

a) Draw the diagram of below types of Automatic Repeat Request (ARQ) in normal operation:
   i. Stop-and-Wait ARQ. (4 Marks)
   ii. Go-Back-N ARQ. (4 Marks)

b) Draw any **TWO (2)** frames in High-level Data Link Control (HDLC). (6 Marks)

c) List any **TWO(2)** types of protocol in each:
   i. Random Access Protocol. (2 Marks)
   ii. Controlled Access Protocol. (2 Marks)
   iii. Channelization Protocol (2 Marks)

Continued...

QUESTION 5 **(20 Marks)**

a) List **THREE (3)** physical implementation of Fast Ethernet. State the types of cable and maximum length (segment) of each implementation. (6 marks)

b) Briefly explain **THREE (3)** physical components of 802.11 LANs. (6 marks)

c) Draw a Local Area Network (LAN) design, which connects between campuses. Connect the core switches on each campus to **ALL** of the following buildings.

Campus Alpha

i. Building Alpha1: Ground floor.
: Consist of 2 unit core switch.
ii. Building Alpha2: Ground floor and 2 upper floor.
: Consist of distribution and access type switch.
iii. Building Alpha3: Ground floor and 2 upper floor.
: Consist of distribution and access type switch.

Campus Beta

i. Building Beta1: Ground floor.
: Consist of 2 unit core switches.
ii. Building Beta2: Ground floor and 2 upper floor.
: Consist of distribution and access type switch.

(8 marks)

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